

REMARKS

Claim 1 has been amended to incorporate the substance of Claim 2 therein. Claims 3-6 have been amended to place them in more readable form. New Claim 8 has been added to a preferred embodiment in which the matrix material is selected from compounds of Examples 1-4. The specification and Claims 1 and 8 have been amended to correct a typographical error and to delete "inlate" and supply "indate". No new matter has been added into the specification, the amended claims or the new claim.

The Examiner has required restriction between Group I, Claims 1-6 and Group II, Claim 7. The reason for the restriction is that a fluorescent thin film can be made by high temperature film deposition. However, the evaporation technique of Claim 7 may be considered a high temperature film deposition, since page 9, lines 21-30 so the specification clearly indicates that the evaporation process can be carried out at a high temperature. Therefore, the Restriction Requirement should be withdrawn and Claim 7 examined along with Claims 1-6. Further, if Claims 1, 3-6 and 8 are ultimately found allowable, Claim 7 should be rejoined under MPEP § 821.04 and allowed.

REQUEST FOR RECONSIDERATION

Claims 1 and 3-8 are active in the case. The Examiner's indication of allowable subject matter in Claim 4 is appreciated.

The rejection of Claims 1, 3, 5 and 6 under 35 U.S.C. § 102(b) as being anticipated by Chadha is traversed. Claim 2 has been incorporated into Claim 1 and, since Chadha neither teaches nor suggests that the matrix material comprises at least one compound selected from the group consisting of a rare earth thioaluminate, a rare earth thiogallate and a rare earth

thioindate, nor does Chadha set forth the particular compounds for the matrix material of Claim 8, it is submitted that the claims are not anticipated by Chadha.

The rejection of Claims 1, 3 and 5 under 35 U.S.C. § 102(b) as being anticipated by Harkonen et al is traversed.

Since the substance of Claim 2 has been incorporated into Claim 1 and Harkonen et al neither teaches nor suggests that the matrix material comprises at least one compound selected from a rare earth thioaluminate, a rare earth thiogallate and a rare earth thioindate, nor does Harkonen et al teach or suggest the particular compounds of Claim 8, it is submitted that the claims are not anticipated by Harkonen et al.

The rejection of Claims 1-3, 5 and 6 under 35 U.S.C. § 102(e) as anticipated by Hampden-Smith et al is traversed.

Hampden-Smith et al is directed to a powder form of phosphor material and is suggestive in column 42 of the use of the phosphor material for an EL display. However, since Hampden-Smith et al is directed to the use of powder phosphor material rather than the use of a fluorescent thin film, as in the present claims, the disclosure of Hampden-Smith et al is significantly different from that of the present claims. Powder phosphor material and a fluorescent thin film differ in terms of how to prepare them and how to make EL devices from them. Hampden-Smith et al further says nothing about how to form powder phosphors into a film to make a flat panel display and Hampden-Smith et al does not demonstrate any flat panel displays in the disclosure. Further, column 36, lines 59-68, referred to by the Examiner in the Official Action, merely states that $Y_2O_2S:Eu$, $Gd_2O_2S:Tb$ and $La_2O_2S:Tb$ represent the main component of the matrix material and a luminescent center, and that activator metals such as Cu, Mn, Ag and Au, inclusive of Al and rare earth elements and their mixtures may be used in an amount of 0.02 to 15 at%. The addition of Al as an activator ion

does not result in a thioaluminate, i.e., $Y_{2-x}Al_xO_2Si:Eu$, but in $Y_2O_2Si:Eu_{1-x}Al_x$, which is not a thioaluminate. The disclosure of Hampden-Smith et al, therefore, neither teaches nor suggests that the matrix material comprises at least one compound selected from the group consisting of a rare earth thioaluminate, a rare earth thiogallate and a rare earth thioindate, nor does Hampden-Smith et al teach or suggest the particular compounds of Claim 8. Therefore, Hampden-Smith et al does not anticipate the claims.

The Abstract has been amended as per the Examiner's suggestions.

The Examiner's objection that the claims do not commence on a separate sheet in accordance with 37 C.F.R. § 1.52(b) is obviated by the fact that Claims 1 and 3-6 have been presented in an amendment and Claim 2 has been cancelled.

It is submitted that Claims 1 and 3-8 are allowable and such action is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



J. Derek Mason
Registration No. 35,270
Attorney of Record

Roland E. Martin
Registration No. 48,082



22850

Telephone: 703-413-3000
Facsimile: 703-413-2220
RLT:REM\la
I:\atty\rem\206138us-am.wpd

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IN THE SPECIFICATION

Please amend the specification as follows:

Page 5, please replace the paragraph at lines 3-7 as follows:

(2) The fluorescent thin film according to (1) above, wherein said matrix material contains as the main component at least one compound selected from the group consisting of a rare earth thioaluminate, a rare earth thiogallate and a rare earth [thioinlate] thioindate.

Page 6, please replace the paragraph at lines 15-23 as follows:

The fluorescent thin film of the present invention comprises a matrix material containing as a main component a rare earth sulfide or a rare earth selenide, and a rare earth element added thereto as a light emission center. This rare earth element contains as a main component at least one compound selected from the group consisting of a rare earth thioaluminate, a rare earth thiogallate and a rare earth [thioinlate] thioindate, and is different from the rare earth element used for the matrix material.

Page 6, please replace the paragraph at lines 24-32 as follows:

Rare earth elements exist in the stable form of sulfides and selenides, and are more stable and more resistant to humidity and oxidation than compounds such as BaS and SrS which occur at intermediate steps of the process of preparing conventional thioaluminates, thiogallates and [thioinlates] thioindates of alkaline earth elements such as Ba, Sr and Ca. For

this reason, the rare earth elements are less susceptible to contamination at a fluorescent thin film preparation step, and can yield a fluorescent thin film of higher quality than ever before.

Page 7, please replace the paragraph at lines 3-5 as follows:

The rare earth thioaluminate, the rare earth thiogallate, the rare earth [thioinlate] thioindate, and the rare earth thioselenate should preferably be represented by the following composition formula:

Page 7, please replace the paragraph at lines 25-35 as follows:

Preferable, but not exclusive, selenides are a rare earth selenaluminate or $R_xAl_ySe_z$ where R is any one of Sc, Y, La, Ce, Pr, Nd, Gd, Tb, Ho, Er, Tm and Lu, and x, y and z are each an integer and may be identical with or different from one another, a rare earth selenagallate or $R_xGa_ySe_z$ where R is any one of Sc, Y, La, Ce, Pr, Nd, Gd, Tb, Ho, Er, Tm and Lu, and x, y and z are each an integer and may be identical with or different from one another, and a rare earth [selenainlate] selenaindate or $R_xIn_ySe_z$ where R is any one of Sc, Y, La, Ce, Pr, Nd, Gd, Tb, Ho, Er, Tm and Lu, and x, y and z are each an integer and may be identical with or different from one another.

Page 8, please replace the paragraph at lines 8-15 as follows:

By evaporation, the rare earth metal and aluminum sulfide are allowed to react with each other on a substrate to obtain a thioaluminate thin film. While the invention is herein explained mainly with reference to the rare earth thioaluminate, it is understood that group III sulfides such as gallium sulfide and indium sulfide may be used to obtain thiogallate and [thioinlate] thioindate. For accelerated sulfurization, it is preferable to use hydrogen sulfide (H.sub.2S) as a sulfur supply source.

IN THE ABSTRACT

Please amend the Abstract as shown on the following sheet:

--ABSTRACT OF THE DISCLOSURE

A fluorescent thin film is provided, [comprising] including a matrix material containing as a main component a rare earth sulfide or a rare earth selenide and a rare earth element [added thereto] additive as a light emission center. The rare earth element additive is different from [a] the rare earth element used for [said] the matrix material.--

IN THE CLAIMS

--1. (Amended) A fluorescent thin film comprising a matrix material which comprises [containing as a main component] a rare earth sulfide or a rare earth selenide, and which further comprises a rare earth element [added thereto] as a light emission center, [said] the rare earth element as the light transmission center being different from [a] the rare earth element [used for said] of the matrix material, and

wherein said matrix material comprises at least one compound selected from the group consisting of a rare earth thioaluminate, a rare earth thiogallate and a rare earth thioindate.

2. (Cancelled)

3. (Amended) The fluorescent thin film according to claim 1, wherein said rare earth element [used for said] of the matrix material is an element selected from the group consisting of Y, La, Ce, Pr, Nd, Gd, Tb, Ho, and Er.

4. (Amended) The fluorescent thin film according to claim 1, wherein [said] the matrix material is lanthanum thioaluminate[, and] or neodymium thioaluminate.

5. (Amended) The fluorescent thin film according to claim 1, wherein [said] the rare earth element [added as said] as the light emission center is at least one element selected from the group consisting of [at least] Ce, Eu, Tb and Tm.

6. (Amended) An EL panel comprising a fluorescent thin film [as recited in] according to claim 1.

8. (New)--